

BBBBBBBBBBBB		AAAAAAA		SSSSSSSSSS		RRRRRRRRRR		TTTTTTTTTTTT		LLL
BBBBBBBBBBBB		AAAAAAA		SSSSSSSSSS		RRRRRRRRRR		TTTTTTTTTTTT		LLL
BBBBBBBBBBBB		AAAAAAA		SSSSSSSSSS		RRRRRRRRRR		TTTTTTTTTTTT		LLL
BBB	BBB	AAA	AAA	SSS		RRR	RRR	TTT		LLL
BBB	BBB	AAA	AAA	SSS		RRR	RRR	TTT		LLL
BBB	BBB	AAA	AAA	SSS		RRR	RRR	TTT		LLL
BBB	BBB	AAA	AAA	SSS		RRR	RRR	TTT		LLL
BBB	BBB	AAA	AAA	SSS		RRR	RRR	TTT		LLL
BBB	BBB	AAA	AAA	SSS		RRR	RRR	TTT		LLL
BBBBBBBBBBBB		AAA	AAA	SSSSSSSS		RRRRRRRRRR		TTT		LLL
BBBBBBBBBBBB		AAA	AAA	SSSSSSSS		RRRRRRRRRR		TTT		LLL
BBBBBBBBBBBB		AAA	AAA	SSSSSSSS		RRRRRRRRRR		TTT		LLL
BBB	BBB	AAAAAAAAAAAA			SSS	RRR	RRR	TTT		LLL
BBB	BBB	AAAAAAAAAAAA			SSS	RRR	RRR	TTT		LLL
BBB	BBB	AAAAAAAAAAAA			SSS	RRR	RRR	TTT		LLL
BBB	BBB	AAA	AAA		SSS	RRR	RRR	TTT		LLL
BBB	BBB	AAA	AAA		SSS	RRR	RRR	TTT		LLL
BBB	BBB	AAA	AAA		SSS	RRR	RRR	TTT		LLL
BBB	BBB	AAA	AAA		SSS	RRR	RRR	TTT		LLL
BBBBBBBBBBBB		AAA	AAA	SSSSSSSS		RRR	RRR	TTT		LLLLLLLLLLLL
BBBBBBBBBBBB		AAA	AAA	SSSSSSSS		RRR	RRR	TTT		LLLLLLLLLLLL
BBBBBBBBBBBB		AAA	AAA	SSSSSSSS		RRR	RRR	TTT		LLLLLLLLLLLL

```
BBBBBBBBB      AAAAAA      SSSSSSSS      EEEEEEEEE      NN      NN      DDDDDDDD      DDDDDDDD      EEEEEEEEE      FFFFFFFFFF
BBBBBBBBB      AAAAAA      SSSSSSSS      EEEEEEEEE      NN      NN      DDDDDDDD      DDDDDDDD      EEEEEEEEE      FFFFFFFFFF
BB      BB      AA      AA      SS      EE      NN      DD      DD      EE      FF
BB      BB      AA      AA      SS      EE      NN      DD      DD      EE      FF
BB      BB      AA      AA      SS      EE      NN      DD      DD      EE      FF
BBBBBBBBB      AA      AA      SSSSSS      EEEEEEE      NN      NN      DD      DD      EEEEEEE      FFFFFFFF
BBBBBBBBB      AA      AA      SSSSSS      EEEEEEE      NN      NN      DD      DD      EEEEEEE      FFFFFFFF
BB      BB      AAAAAAAAAA      SS      EE      NN      NN      DD      DD      EE      FF
BB      BB      AAAAAAAAAA      SS      EE      NN      NN      DD      DD      EE      FF
BB      BB      AA      AA      SS      EE      NN      NN      DD      DD      EE      FF
BB      BB      AA      AA      SS      EE      NN      NN      DD      DD      EE      FF
BBBBBBBBB      AA      AA      SSSSSSSS      EEEEEEEEE      NN      NN      DDDDDDDD      DDDDDDDD      EEEEEEEEE      FF
BBBBBBBBB      AA      AA      SSSSSSSS      EEEEEEEEE      NN      NN      DDDDDDDD      DDDDDDDD      EEEEEEEEE      FF
```

....
....
....
....

```
LL      IIIIII      SSSSSSSS
LL      IIIIII      SSSSSSSS
LL      II      SS
LL      II      SS
LL      II      SS
LL      II      SS
LL      II      SSSSSS
LL      II      SSSSSS
LL      II      SS
LL      II      SS
LL      II      SS
LL      II      SS
LLLLLLLLLL      IIIIII      SSSSSSSS
LLLLLLLLLL      IIIIII      SSSSSSSS
```



```
0001 0 MODULE BASSEND_DEF (
0002 0 IDENT = '1-013'
0003 0 ) =
0004 1 BEGIN
0005 1
0006 1 *****
0007 1 *
0008 1 * COPYRIGHT (c) 1978, 1980, 1982, 1984 BY
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0024 1 * SOFTWARE ON EQUIPMENT WHICH IS NOT SUPPLIED BY DIGITAL.
0025 1 *
0026 1 *
0027 1 *****
0028 1
0029 1
0030 1
0031 1 ++
0032 1 FACILITY: BASIC-PLUS-2 Frame Support
0033 1
0034 1 ABSTRACT:
0035 1
0036 1 These routines set up and tear down frames for BASIC-PLUS-2.
0037 1 Frames are used for main routines, external functions,
0038 1 external subroutines, internal functions (both DEFs and DEF*s)
0039 1 internal subroutines (GOSUBs) and condition handlers.
0040 1
0041 1 ENVIRONMENT: VAX-11 user mode
0042 1
0043 1 AUTHOR: John Sauter, CREATION DATE: 10-Oct-78
0044 1
0045 1 MODIFIED BY:
0046 1
0047 1 1-001 - Original. This is just a skeleton.
0048 1 1-002 - Copy code from BASSEND. JBS 07-FEB-1979
0049 1 1-003 - Change stack frame prefix from BAS$ to BSF$. JBS 08-FEB-1979
0050 1 1-004 - Purge any FIELD variables when deallocating them. JBS 28-FEB-1979
0051 1 1-005 - Deallocate only the dynamic string templates, not the fixed
0052 1 string templates. JBS 20-MAR-1979
0053 1 1-006 - Remove edit 004--the compiled code will call the routine which
0054 1 purges field variables so that the field code will not have
0055 1 to be in the sharable library. JBS 02-APR-1979
0056 1 1-007 - Similarly, don't flush virtual arrays. JBS 09-APR-1979
0057 1 1-008 - Change OTS$$ and LIB$$ to STR$. JBS 21-MAY-1979
```

BASSEND_DEF
1-013

G 5
16-Sep-1984 00:21:58
14-Sep-1984 11:54:54

VAX-11 Bliss-32 V4.0-742
[BASRTL.SRC]BASENDDDEF.B32;1

Page 2
(1)

```
: 58      0058 1 : 1-009 - Correct the calls to STR$FREE1_DX. JBS 22-MAY-1979
: 59      0059 1 : 1-010 - Another correction to the calls to STR$FREE1_DX.
: 60      0060 1 : JBS 22-MAY-1979
: 61      0061 1 : 1-011 - Use the JSB entry point to STR$FREE1_DX. JBS 11-JUN-1979
: 62      0062 1 : 1-012 - Give a better error message when an error handler runs
: 63      0063 1 : runs off the end of a function. JBS 24-JUL-1979
: 64      0064 1 : 1-013 - Call BAS$$UNWIND when cutting back a GOSUB frame.
: 65      0065 1 : JBS 03-AUG-1979
: 66      0066 1 : --
: 67      0067 1 :
: 68      0068 1 : <BLF/PAGE>
```



```
70 0069 1 |
71 0070 1 | SWITCHES:
72 0071 1 |
73 0072 1 |
74 0073 1 | SWITCHES ADDRESSING_MODE (EXTERNAL = GENERAL, NONEXTERNAL = WORD_RELATIVE);
75 0074 1 |
76 0075 1 |
77 0076 1 | LINKAGES:
78 0077 1 |
79 0078 1 |
80 0079 1 | LINKAGE
81 0080 1 |     BAS$INIT_LINK = JSB (REGISTER = 0, REGISTER = 1, REGISTER = 2) : !
82 0081 1 |     GLOBAL (BSF$A_MAJOR_STG = 11, BSF$A_MINOR_STG = 10, BSF$A_TEMP_STG = 9) !
83 0082 1 |     NOPRESERVE (8, 7, 6, 5, 4, 3, 2, 1, 0);
84 0083 1 |
85 0084 1 | REQUIRE 'RTLIN:STRLNK'; ! String facility linkages
86 0269 1 |
87 0270 1 |
88 0271 1 | TABLE OF CONTENTS:
89 0272 1 |
90 0273 1 |
91 0274 1 | FORWARD ROUTINE
92 0275 1 |     BASSEND_DEF_R8 : NOVALUE BAS$INIT_LINK; ! end DEF
93 0276 1 |
94 0277 1 |
95 0278 1 | INCLUDE FILES:
96 0279 1 |
97 0280 1 |
98 0281 1 | REQUIRE 'RTLIN:RTLPSECT'; ! macros for defing psects
99 0376 1 |
100 0377 1 | REQUIRE 'RTLIN:BASFRAME'; ! Define frame structure
101 0580 1 |
102 0581 1 | REQUIRE 'RTLIN:BASINARG'; ! Define argument list
103 0665 1 |
104 0666 1 |
105 0667 1 | MACROS:
106 0668 1 |
107 0669 1 |     NONE
108 0670 1 |
109 0671 1 | EQUATED SYMBOLS:
110 0672 1 |
111 0673 1 |     NONE
112 0674 1 |
113 0675 1 | PSECTS:
114 0676 1 |
115 0677 1 | DECLARE_PSECTS (BAS); ! declare psects for BAS$ facility
116 0678 1 |
117 0679 1 | OWN STORAGE:
118 0680 1 |
119 0681 1 |     NONE
120 0682 1 |
121 0683 1 | EXTERNAL REFERENCES:
122 0684 1 |
123 0685 1 |
124 0686 1 | EXTERNAL ROUTINE
125 0687 1 |     BAS$$STOP : NOVALUE, ! signals error
126 0688 1 |     STR$FREE1_DX_R4 : STR$JSB_GETFRE, ! Deallocate a string
```

```

: 127      0689 1      BAS$$UNWIND : NOVALUE,      ! Unwind a frame
: 128      0690 1      BAS$HANDLER;                ! Marker for BASIC frame
: 129      0691 1
: 130      0692 1      !+
: 131      0693 1      !- The following are the error codes used in this module.
: 132      0694 1      !-
: 133      0695 1
: 134      0696 1      EXTERNAL LITERAL
: 135      0697 1      BAS$K_RETWITGOS : UNSIGNED (8),      ! RETURN without GOSUB
: 136      0698 1      BAS$K_PROLOSSOR : UNSIGNED (8),      ! Program lost, sorry
: 137      0699 1      BAS$K_NOTIMP : UNSIGNED (8),          ! Not implemented
: 138      0700 1      BAS$K_FNEWITFUN : UNSIGNED (8),        ! FNEW without FUNCTION CALL
: 139      0701 1      BAS$K_ERRTRANEE : UNSIGNED (8);        ! ERROR trap needs RESUME
: 140      0702 1

```



```
142 0703 1 GLOBAL ROUTINE BASSEND_DEF_R8 (
143 0704 1     ARGLIST
144 0705 1     ) : NOVALUE BASS$INIT_LINK =
145 0706 1
146 0707 1 ++
147 0708 1 FUNCTIONAL DESCRIPTION:
148 0709 1
149 0710 1     Tear down a frame for a BASIC-PLUS-2 DEF.
150 0711 1     All heap storage is deallocated. The argument is the same
151 0712 1     as for BASS$INIT_DEF_R8, for validity checking.
152 0713 1
153 0714 1 FORMAL PARAMETERS:
154 0715 1
155 0716 1     ARGLIST.ra.v List of information used to set up the
156 0717 1     frame. See BASIC-PLUS-2/VAX Description
157 0718 1     of Generated Code for details.
158 0719 1
159 0720 1 IMPLICIT INPUTS:
160 0721 1
161 0722 1     The frame, as set up by BASS$INIT_DEF_R8.
162 0723 1
163 0724 1 IMPLICIT OUTPUTS:
164 0725 1
165 0726 1     NONE
166 0727 1
167 0728 1 ROUTINE VALUE:
168 0729 1
169 0730 1     NONE
170 0731 1
171 0732 1 COMPLETION CODES:
172 0733 1
173 0734 1     NONE
174 0735 1
175 0736 1 SIDE EFFECTS:
176 0737 1
177 0738 1     Deallocates the heap storage and virtual arrays local to this
178 0739 1     DEF.
179 0740 1
180 0741 1 --
181 0742 1
182 0743 2 BEGIN
183 0744 2
184 0745 2 EXTERNAL REGISTER
185 0746 2     BSF$A_MAJOR_STG : REF BLOCK [0, BYTE],
186 0747 2     BSF$A_MINOR_STG : REF BLOCK [0, BYTE],
187 0748 2     BSF$A_TEMP_STG : REF VECTOR;
188 0749 2
189 0750 2 BUILTIN
190 0751 2     FP;
191 0752 2
192 0753 2 MAP
193 0754 2     ARGLIST : REF BLOCK [0, BYTE] FIELD (BASS$INIT_ARGS); ! arg list
194 0755 2
195 0756 2 REGISTER
196 0757 2     FMP : REF BLOCK [0, BYTE] FIELD (BSF$FCD); ! pointer to FCD
197 0758 2     PREV_FMP : REF BLOCK [0, BYTE] FIELD (BSF$FCD); ! previous FCD
198 0759 2
```

```
199 0760 2
200 0761 2  + First cut back any GOSUB frames. We wish to make the presence of
201 0762 2  the GOSUB frame invisible except on traceback.
202 0763 2  -
203 0764 2    FMP = .FMP;
204 0765 2
205 0766 2    WHILE (.FMP [BSF$B_PROC_CODE] EQL BSF$K_PROC_GOSB) DO
206 0767 2      BEGIN
207 0768 2  +
208 0769 2  We have a GOSUB frame, remove it. Note we do not restore any
209 0770 2  registers it might have saved.
210 0771 2  -
211 0772 2    BAS$$UNWIND (.FMP);
212 0773 2    PREV_FMP = .FMP [BSF$A_SAVED_FP];
213 0774 2
214 0775 2    IF (.PREV_FMP [BSF$A_HANDLER] NEQA BAS$HANDLER)
215 0776 2      THEN
216 0777 2  +
217 0778 2  The previous frame is not a BASIC frame. This is unreasonable
218 0779 2  since GOSUBs should only be callable from inside a BASIC main
219 0780 2  procedure.
220 0781 2  -
221 0782 2    BAS$$STOP (BAS$K_RETWITGOS);
222 0783 2
223 0784 2    FMP = .PREV_FMP;
224 0785 2    END;
225 0786 2
226 0787 2  +
227 0788 2  Make sure this is a DEF frame.
228 0789 2  -
229 0790 2
230 0791 2    CASE .FMP [BSF$B_PROC_CODE] FROM BSF$K_PROC_MAIN TO BSF$K_PROC_IOL OF
231 0792 2      SET
232 0793 2
233 0794 2      [BSF$K_PROC_ONER] :
234 0795 2        BAS$$STOP (BAS$K_ERRTRANEE);
235 0796 2
236 0797 2      [BSF$K_PROC_DEF] :
237 0798 2        BEGIN
238 0799 2          0
239 0800 2        END;
240 0801 2
241 0802 2      [INRANGE, OTRANGE] :
242 0803 2        BAS$$STOP (BAS$K_PROLOSSOR);
243 0804 2      TES;
244 0805 2
245 0806 2  +
246 0807 2  Check to be sure that this is the correct exit. This should
247 0808 2  only fail if the compiler allows non-local gotos from a DEF,
248 0809 2  or the equivalent using condition handling.
249 0810 2  -
250 0811 2
251 0812 2    IF (.FMP [BSF$A_INIT_ARG] NEQA .ARGLIST)
252 0813 2      THEN
253 0814 2  +
254 0815 2  The argument lists are not at the same address. This exit must not
255 0816 2  correspond to the entry. Signal an error.
```



```
256 0817 2 :-
257 0818      BAS$$STOP (BAS$K_FNEWITFUN);
258 0819
259 0820 2 :-
260 0821 2 :- Deallocate any temporary string storage.
261 0822 2 :-
262 0823 2 :-
263 0824      INCR COUNTER FROM 1 TO .ARGLIST [BAS$L_IN NO_TST] DO
264 0825      STR$FREE1_DX_R4 (BSF$A_TEMP_STG [(COUNTER - 1)*2]);
265 0826
266 0827 2 :-
267 0828 2 :- Deallocate local dynamic strings.
268 0829 2 :-
269 0830 2 :-
270 0831      INCR COUNTER FROM 1 TO .ARGLIST [BAS$W_IN NO_DST] DO
271 0832      STR$FREE1_DX_R4 (.FMP [BSF$A_STR_DESC] + (2*%UPVAL*(COUNTER - 1)));
272 0833
273 0834 2 :-
274 0835      All done. The 'RET' instruction done by the compiled code
275 0836      will cut back the stack, so we don't need to do it here.
276 0837 2 :-
277 0838      FP = .FMP;
278 0839      RETURN;
279 0840 1      END;
```

! of BAS\$END_DEF_R8

.TITLE BAS\$END_DEF
.IDENT \1-013\.EXTRN BAS\$\$STOP, STR\$FREE1_DX_R4
.EXTRN BAS\$\$UNWIND, BAS\$HANDLER
.EXTRN BAS\$K_RETWITGOS
.EXTRN BAS\$K_PROLOSSOR
.EXTRN BAS\$K_NOTIMP, BAS\$K_FNEWITFUN
.EXTRN BAS\$K_ERRTRANEE

.PSECT _BAS\$CODE,NOWRT, SHR, PIC,2

57	50	DO	00000	BAS\$END_DEF_R8::	MOVCL	R0, R7	0703
55	5D	DO	00003		MOVL	FP, FMP	0764
06	E5	A5	91	00006 1\$:	CMPB	-27(FMP), #6	0766
		29	12	0000A	BNEQ	3\$	
		55	DD	0000C	PUSHL	FMP	0772
00000000G	00	01	FB	0000E	CALLS	#1, BAS\$\$UNWIND	
	52	0C	A5	DO	MOVL	12(FMP), PREV_FMP	0773
50	00000000G	00	9E	00019	MOVAB	BAS\$HANDLER, R0	0775
50		62	D1	00020	CMPL	(PREV_FMP), R0	
		0B	13	00023	BEQL	2\$	
7E	00G	8F	9A	00025	MOVZBL	#BAS\$K_RETWITGOS, -(SP)	0782
00000000G	00	01	FB	00029	CALLS	#1, BAS\$\$STOP	
	55	52	DO	00030 2\$:	MOVL	PREV_FMP, FMP	0784
		D1	11	00033	BRB	1\$	0766
0021	07	01	E5	A5	8F	00035 3\$:	0791
0010	0010	0010	0010	0003A 4\$:	.WORD	5\$-4\$,-	
0010	0016	0010	0010	00042		5\$-4\$,-	
						5\$-4\$,-	

						8\$-4\$,-		
						5\$-4\$,-		
						5\$-4\$,-		
						6\$-4\$,-		
						5\$-4\$,-		
						5\$-4\$,-		
	7E	00G	8F	9A	0004A	5\$:	MOVZBL #BAS\$K_PROLOSSOR, -(SP)	0803
			04	11	0004E		BRB	
	7E	00G	8F	9A	00050	6\$:	MOVZBL #BAS\$K_ERRTRANEE, -(SP)	0795
00000000G	00		01	FB	00054	7\$:	CALLS #1, BAS\$\$\$STOP	
	57	D8	A5	D1	0005B	8\$:	CMPL -40(FMP), ARGLIST	0812
			0B	13	0005F		BEQL	
	7E	00G	8F	9A	00061		MOVZBL #BAS\$K_FNEWITFUN, -(SP)	0818
00000000G	00		01	FB	00065		CALLS #1, BAS\$\$\$STOP	
			56	D4	0006C	9\$:	CLRL COUNTER	0825
			0F	11	0006E		BRB	
50	56		01	78	00070	10\$:	ASHL #1, COUNTER, R0	
	50	F8 A940	DE	00074			MOVAL -8(BSF\$A_TEMP_STG)[R0], R0	
		00000000G	00	16	00079		JSB STR\$FREE1 DX_R4	
EC	56	30	A7	F3	0007F	11\$:	AOBLEQ 48(ARGLIST), COUNTER, 10\$	0831
	57	28	A7	3C	00084		MOVZWL 40(ARGLIST), R7	0832
			56	D4	00088		CLRL COUNTER	
			0E	11	0008A		BRB	
	50	E0 B546	7E	0008C	12\$:	MOVAQ @-32(FMP)[COUNTER], R0		
	50		08	C2	00091		SUBL2 #8, R0	
		00000000G	00	16	00094		JSB STR\$FREE1 DX_R4	
EE	56		57	F3	0009A	13\$:	AOBLEQ R7, COUNTER, -12\$	0838
	5D		55	D0	0009E		MOVL FMP, FP	0840
			05	000A1		RSB		

; Routine Size: 162 bytes, Routine Base: _BAS\$CODE + 0000

:	280	0841	1	
:	281	0842	1	END
:	282	0843	1	
:	283	0844	0	ELUDOM

PSECT SUMMARY

Name	Bytes	Attributes
_BAS\$CODE	162	NOVEC, NOWRT, RD, EXE, SHR, LCL, REL, CON, PIC, ALIGN(2)

COMMAND QUALIFIERS

; BLISS/CHECK=(FIELD, INITIAL, OPTIMIZE)/NOTRACE/LIS=LIS\$:BASENDDDEF/OBJ=OBJ\$:BASENDDDEF MSRC\$:BASENDDDEF/UPDATE=(ENH\$:BASENDDDEF

BASSEND_DEF
1-013

N 5
16-Sep-1984 00:21:58
14-Sep-1984 11:54:54

VAX-11 Bliss-32 V4.0-742
[BASRTL.SRC]BASENDDDEF.B32;1

Page 9
(3)

;)

: Size: 162 code + 0 data bytes
: Run Time: 00:06.2
: Elapsed Time: 00:14.4
: Lines/CPU Min: 8207
: Lexemes/CPU-Min: 28813
: Memory Used: 69 pages
: Compilation Complete

0022 AH-BT13A-SE
VAX/VMS V4.0

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BASEDDGB
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BASERTXT
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